that now occupies it, whose shallow bed is but a few feet below the bed of the ancient river, a flat rock bottom covered by a few inches of soil.

Chicago, Ill.

LICHEN NOTES—No. 1.

G. K. MERRILL.

Since the publication of Prof. Fink's paper on *Cladonia verticillata* Hoffm. (BRYOLOGIST, **7**:6, 1904) several correspondents have enquired concerning the validity of *C. gracilis* (L.) Nyl. var. *verticillata* Fr. as the name given to plants of similar appearance in their herbaria. To these we will say: the nominations are equivalent and stand for identical forms.

The synonymy of the plant is a varied one. Called by Hoffman (Deutsch. Fl. (1796) p. 122) *C. pyxidata*, **C. verlicillata*, that name is retained in the works of Floerke, Schaerer, Babington, Coemans, Wainio and others, all of whom concede to it specific rank. Elias Fries (Lich. Eur. Ref. (1831) p 219) was first to correlate the plant with *C. gracilis*, and it is only natural that our own Tuckerman, pupil of the great master, and throughout life dominated by his teachings, should take the same ground. Such a view is not difficult, as all field workers will agree. We often find undoubted *C. gracilis* proliferous from the center of scyphi, and again verifiable *C. verticillata* with elongated podetia and narrowed cups or rarely ascyphiferous forms with subulate terminations. In our copy of Macoun's Canadian Lichens, No. 295, this condition of *verticillata* is beautifully exemplified and furnishes a remarkable exhibit of transitional tendencies. Nevertheless *C. verticillata* is sufficiently differentiated from *C. gracilis* when examined in typical specimens to be considered distinct. The connecting forms are of no more importance than those serving to link other species in the polymorphous potpourri of the Cladoniaea.

The chemical test with KHO seems to be without particular value in this group. Wainio states that there is no reaction in *C. verticillata*, and in *C. gracilis* there may or may not be. Leighton declares that no reaction is noted with either, while Parrique finds none with *C. gracillis chordalis*, doubtful results with *C. gracilis elongata* and none with *C. verticillata* with the exception of varieties *subcervicornis* Wainio and *Krempelhuberi* Wainio, both of which owe their separation to this feature.

Wainio subdivides the verticillata group into three varieties with several forms and modifications. Comprehending within the meaning of the term variety those forms of closest adherence to the type (varietas constantior=v.), he uses the word form to define phases of perverse development, not self determinative (forma autogenetica inconstans=f.) and modification is applied to anamorphic conditions produced through peculiarities of environment (modificatio inconstans statione producta=m.)

Our continental North American representatives so far known are:

C. verticillata Hoffm. v. evoluta Th. Fr.

v. evoluta m. phyllocephala Flot.

v. evoluta f. apoticta (Ach) Wainio.
m. cervicornis (Ach.) Flk.
m. abbreviata Wainio.

C. verticillata evoluta Th. Fr. is well described in Prof. Fink's article l. c. under the specific definition of *C. verticillata*, and our notes are intended to be but supplementary. Quoting from Th. M. Fries, Lich. Scan. Pt. I- p. 83, in diagnosis of the species "podetia breviscula" is given as a characteristic. Our American plants are often of very robust habit and considerable height. Podetia has been noted 70 mm. in length. While simple forms are frequently found, this condition if abundant may be taken for abortive. The plants are normally three to five ranked, and eleven were counted in a specimen from Prof. Macoun. The cups are variable in diameter, very narrow in the terminating scyphus and at times reaching 20 mm. with the first rank. Podetia are often found proliferating from the sides as well as from the cups. These are observed to take an initial direction at right angles to that of the podetia, at length if the plant is erect bending to conform. If the parent podetia is deflected the proliferations no longer conform but assume a perpendicular. Instances have been noted where branches originating on the under side of a bent podetia recurved to an upright position. Krempelhuber nominated this phase of development as f. *lateralis* (Lich. Bay. p. 107.). In this connection it may be of interest to record that Schaerer (Enu. p. 195) called those plants proliferous from the center of the cups, f. *centralis*, from the margins, f. *marginalis* and F. *aggregata* (Del.) Malbr. (Supp. Lich. Norm. p. 11) was applied to such as were numerously proliferate from within the scyphus. The variety *evoluta* is well represented by Plate XI, fig. 2, accompanying Prof. Fink's article l. c., and it is difficult to conceive of any other place for Fig. 1 from the point of view developed by Wainio. It may be said for the benefit of the students that (sensu Wainio) the nomination *C. verticillata* per se stands for the entire group. No type form is recognized and the varying phases of the plant are referred to some one of the varieties, forms or modifications or to transitional states between. Prof. Fink's article gives a wide distribution for the variety, we can add nothing to it.

C. verticillata evoluta m. *phyllocephala* Flot. is differentiated principally from v. *evoluta* by the podetia being more or less squamulose, often densely so within the cups. Corticated the same and proliferating similarly its divergence from *evoluta* is controlled by external influences. Symphycarpous states (evidently abortive) are often met with and suggest the idea that similar conditions of other species are likewise abortive. The phenomena of foliolose development in the Cladoniaea is little understood. Two forms are noted, the first (pseudo-foliola) formed by breaking up the cortical tissue into irregular leaf-like expansions. The second (true-squamae) either originating with the podetia, or, initially extrinsic, and communicated through agencies yet undefined from plants normally squamulose to those usually free. Instances have been noted of Cladonia colonies comprising several species in which all were beset with squamae, when only one mem-

ber of the group was recognized to be typically folioliferous. Specimens have been examined from Massachusetts collected by Miss Carr and Mr. Walter Gerritson. It has also been collected on Mt. Washington.

C. verticillata evoluta f. *apoticta* (Ach.) Wainio. A very curious form collected by Miss C. M. Carr, on sterile soil, Sudbury, Mass., is referred here.

C. verticillata m. *cervicornis* (Ach.) Flk. Examination of numerous European examples emphasize the fact that the caespitose macrophylline primary thallus is the only really distinctive character. Typically inconstant in all other of its exprsssions the Europeans have applied a host of definative phrases to the varying conditions. Such American material as we have seen is referable to Floerk's f. *phyllophora* (De Clad. p. 28) and Nylander's f. *polycarpoides* (Li. Par p. 30.) the former received from Prof. Macoun collected at Mt. Murray, Quebec, and the latter from Miss Carr, collected in Sudbury. Of Miss Carr's plant we can only provisionally place it. European specimens of f. *polycarpoides* are provided with a conspicuous primary thallus, in the Sudbury plant the thallus is deficient. Nylander unites the form with his v. *cervicornis*, but our specimen seems more an expression of v. *evoluta*. It is true that in the obliteration of the scyphi by dissection into fastigiate branchlets there is a strong point of resemblance to cervicornis but ours occurred unmixed with V. evoluta, and may be but a modification.

C. verticillata m. *abbreviata* Wainio, constituted on material collected by Henry Willey in New Bedford, Mass., seems on the whole to be but an expression of m. *cervicornis*. Reduced in both thallus and podetia the state is probably the result of aridity of habitat. Examination of a French specimen detetmined by Wainio discloses many points of similarity with m. *cervicornis*, the most conspicuous of which was the congested horizontal thallus. We have recently found the plant in our own region.

Rockland, Maine.

A NOTE ON LOCAL MOSS DISTRIBUTION.

JOHN M. HOLZINGER.

The mode of occurrence of several mosses characteristic of the vicinity of Winona, Minn., on the bluffs facing the upper Mississippi valley, appears to follow a very definite law of distribution on a small scale. This fact did not become clear to the writer till this summer, when an opportunity was afforded of a somewhat close exploration for mosses of the bluffs around Dakota, a village on the banks of the "Great Father of Waters," some twenty miles below Winona. Briefly stated, the characteristic mosses near river level (820 feet above the Gulf of Mexico) are *Barbula obtusifolius*, *Bryum pendulum* and *Leptobryum pryiforme*, all occurrring in great abundance on perpendicular sand ledges kept moist more or less throughout the year, and lying in the shade, The Chicago, Milwaukee and St. Paul Railroad here skirts the west bank of the river from La Crosse to St. Paul. Its bed runs just above high water mark. In many places it is hewn out of the solid sand

ERRATA

Page 1, line 13 from bottom, for *Sullivantae* read *Sullivantiae*.

Page 2, line 18 from bottom, for Europeae read Europaea.

Page 3, line 10 from bottom, for Europea read Europaea.

Page 6, line 15, for ONITHOPODIOIDES read ORNITHOPODIOIDES.

Page 7, line 21, for INTEGROFOLIA read INTEGRIFOLIA.

Page 25, line 12, for iodine read iodide

Page 43, line 7 from bottom, for Sphaerocaphalus read Sphaerocephalus.

Page 51, line 22, for saxitalis read saxatilis.

Page 53, line 15, for *endivaefolia* read *endiviaefolia*.

Page 53, line 18, for *Lyelii* read *Lyellii*.

Page 54, line 11, for *leavis* read *lævis*.

Page 57, line 3 of Explanation of Plate V, for *asplenoides* read *asplenioides*.

Page 71, line 2, for **M. C.** read **C. M.**

Page 80, line 10, for **n. sp.** read **nom. nov.**

Page 94, line 8 from bottom, for *cylindrothecium* read *cladorrhizans*.

Page 102, line 8 of key, insert b before Ap. scarlet or orange.

Page 102, last line, for *Everina* read *Evernia*.

Page 103, line 3, for *Everina* read *Evernia*.

Page 103, line 15, for fibrilose read fibrillose.

Page 104, line 18, for filbrillose read fibrillose.

Page 106, line 5, for verraculose read verruculose.

Page 109, line 16 from bottom, for thallus read talus.

Page 112, line 12, for Floerk's read Floerke's.